CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 99-063

ADOPTION OF SITE CLEANUP REQUIREMENTS FOR:

MOBIL OIL CORPORATION AND
PORT OF OAKLAND

for the property located at

FORMER MOBIL BULK TERMINAL AT THE PORT OF OAKLAND
OAKLAND
ALAMEDA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter Board), finds that:

1. **Site Location:** The subject property (the "Site") is located on 909 Ferry Street (street no longer in existence), Oakland, occupying parts of the Port of Oakland's current Berths 23 and 24. It measures 1,500 feet by 1,000 feet, covering approximately 34 acres. The Site is bounded on the west by the Oakland Outer Harbor, and on the north and south by other Port berths. Ferry Street previously divided the Site into Mobil East and West Facilities.

2. **Site History:** The Site has been owned by the Port of Oakland (Port) since before Mobil Oil Corporation's (Mobil) operations. Pursuant to a lease with the Port, General Petroleum Corporation operated a bulk terminal for petroleum product storage and distribution on-site from 1924 to approximately 1966. In 1960, General Petroleum Corporation became a part of the Mobil Oil Corporation, and Mobil became the legal successor-in-interest to General Petroleum. The lease was then assigned to Mobil in 1966. Southern Pacific Pipe Lines, Inc. supplied refined petroleum to the Site by underground pipes. The refined petroleum was mixed and stored on-site in large aboveground tanks (ASTs) and underground storage tanks (USTs).

   The Port owned some buildings, structures, facilities, improvements, and other fixtures on-site, including four petroleum storage tanks located at the Mobil East Facility. Mobil and its predecessors owned the four petroleum storage tanks at the Mobil West Facility.

   Petroleum products stored at the Site included diesel fuel, leaded and unleaded gasoline, premium gasoline and gasoline additives, heating oil, and various other heavy oil products.

Mobil's lease expired on January 9, 1979, at which time the bulk terminal was dismantled to accommodate containerized cargo terminals, operated by Maersk Terminals, Inc.. What remained of the Mobil facilities was demolished in the early 1980s.

3. **Named Discharger:** Mobil Oil Corporation is named a discharger because it and its predecessors-in-interest operated on Site from 1924 to 1979 and caused releases of the pollutants found in the subsurface on-site. The Port of Oakland is named as a discharger because it was and continues to be the property owner during and after the time of the activity that resulted in the discharge, had knowledge of the discharge or the activities that caused the discharge, and had the legal ability to prevent the discharge.

   If additional information is submitted indicating that other parties caused or permitted any waste to be discharged on the Site where it entered or could have entered waters of the state, the Board will consider adding that party's name to this order.

4. **Regulatory Status:** This site is currently not subject to Board Order. However it has been under active regulatory oversight either by the Alameda County Department of Environmental Health or the Board since 1979.

5. **Site Hydrogeology:** The Site is underlain by hydraulic fill, Bay Muds, and sand zones. The fill extends from immediately below the pavement to depths ranging from approximately 15 to 20 feet below ground surface (bgs). It consists of fine to medium sand interbedded with silty sand, clayey sand, and sandy silt. The Young Bay Mud below consists of clay and silty clay with lenses of sand and silt and ranges in thickness between 0.5 and 6 feet. Beneath the Young Bay Mud is the first sand zone consisting of silty sand to depths of approximately 32 feet bgs. The layer designated as the Old Bay Mud consists of clayey sand of 5 to 10 feet in thickness extending from below the first sand zone to the second sand zone. The second sand zone reaches a depth of approximately 72 feet bgs, which is, in turn, underlain by a silty clay unit.

   Depth to groundwater varies from approximately 5.5 to 10.9 feet bgs. The general direction of groundwater flow is west toward the San Francisco Bay. There is an apparent groundwater mound beneath the central portion of the Site which could locally influence the flow direction. Moreover, a seawall along the shoreline separates the Bay from inland. There is also a seawall along the Bay shoreline. However, studies showed that waves can propagate through and below the seawall, and therefore, groundwater underlying at least the western portion of the Site appears to be subject to tidal influences.

6. **Remedial Investigation:** The primary pollutants found in the subsurface are total petroleum hydrocarbons as gasoline (TPH-g) and their related constituents. Total petroleum hydrocarbons as diesel (TPH-d) also exist on-site in smaller quantities.

- TPH-g was detected in soil at concentrations ranging from 0.0015 to 12,000 ppm. There was also some TPH-d ranging from 0.0022 to 8.7 ppm. The maximum concentration measured for benzene in the soil in 1997 was 41 ppm. Toluene, ethylbenzene, and total xylenes yielded maximum concentrations of 250, 120, and 670 ppm, respectively, with the heaviest contamination generally observed at depths greater than 6 feet bgs.

- Total petroleum hydrocarbon concentrations up to 56,000 ppmv in soil gas were reported in 1987 in the area of the former Mobil West Facility. The total concentrations of benzene, toluene, ethylbenzene, and xylene (BTEX) in the soil gas, however, were significantly lower than total hydrocarbon concentrations. Specifically, the concentration of benzene in the soil gas ranged from below detection limit to 72 ppmv.

- Investigations in 1997 revealed methane concentrations in the vadose zone as high as 47%. The area with the highest concentrations of methane appears to overlie locations where significant free product was found, in the area where the Mobil West Facility was located. High concentrations of benzene were also detected in the groundwater in this area with some reported 1997 figures as high as 22,000 and 31,000 ppb. A TPH-g detection of 38,000 ppb in the groundwater was reported at around the same time in this area as well.

- TPH-g is present on-site in both the free and dissolved phases. In 1980, it was estimated that there were approximately 300,000 to 400,000 gallons of free product beneath the Site. Most of the free product was found under the general area of the former Mobil West Facility. However, this estimate was based on the apparent thickness of product in monitoring wells and therefore exaggerated the true volume of free product.

  A free product recovery system was installed and began operation in February 1982. The system had resulted in a significant reduction in the total product volume by 1984. Results of recent monitoring revealed that the free product is limited to groundwater monitoring wells MW-30, MW-32, and MW-33, at the western and northwestern portions of the Site. The use of the SPILLVOL model estimated the amount of free product left to be 13,900 gallons in 1996.

- A dissolved-phase groundwater contaminated plume was also identified beneath parts of the Site. TPH-g has been detected at concentrations up to 220,000 ppb, north of the former ASTs. However, when analyzed for BTEX, the highest concentrations were observed east of the former ASTs. The maximum concentrations detected for benzene, toluene, ethylbenzene, and xylene were 55,000 ppb, 61,000 ppb, 16,000 ppb, and 76,000 ppb, respectively.

- On January 9, 1997, Mobil presented its *Groundwater Flow and Contaminant Transport Modeling Report*. The model revealed that the primary pathway for chemical plume migration into the Bay is most likely through a limited space below the seawall at a depth of 40 to 50 feet bgs.

  The model considered scenarios with and without a groundwater mound at the center of the Site. The results showed that the migration of BTEX into the Bay would be less in the case of no groundwater mounding. It was estimated that, under the influence of a groundwater mound, the mass flux of benzene into the Bay ranges between 9.33 grams per year in year 2 to 352 grams per year in year 20. Without the mound, 6.7 grams per year was estimated to enter the Bay in year 2 and 138 grams in year 20. The mass fluxes translate into an average benzene concentration of 16.7 ppb in the outflow into the Bay with a groundwater mound and 8.27 ppb, without a mound. Board staff reviewed and concurred with the conclusions of this report and that the amount of BTEX estimated to be entering the Bay from the subject site appears to be insignificant.

Additional remedial investigation is needed to:

a. assess the vertical groundwater gradient, if any, and vertical distribution of petroleum hydrocarbons;
b. verify the fate and transport study results;
c. demonstrate that free product has been removed to the extent practicable; and
d. assess the explosive dangers posed by methane during construction activities and in current and future site use scenarios.

7. **Interim Remedial Measures:** Following Mobil's decontamination of the tanks and related pipelines, the Port dismantled the bulk oil facilities to accommodate containerized cargo terminals in the early 1980s. This included the removal of six large and one small ASTs, associated piping and distribution systems, and on-site buildings. The Site was subsequently regraded and repaved.

In early 1982, Mobil designed and installed a recovery system to recover the separate-phase petroleum product. It consisted of five 24-inch-diameter recovery wells and 12 water injection wells. Recovered product was separated from groundwater and stored in ASTs. Pumped groundwater was returned to the water table untreated. Pursuant to instructions by Mobil's contractor, the Port performed routine operational maintenance on the extraction system until approximately 1989 and reportedly removed approximately 59,000 gallons of free product. From 1994 to 1995, Mobil also performed free product removal from the existing wells on-site by skimming.

Depending on the results of additional remedial investigation and risk assessment regarding the methane gas, remediation and/or risk management may be required to ensure human health and safety.

8. **Adjacent Sites:** The areas surrounding the Site are heavily industrialized. Ashland Oil Company of California operated the Ashland Oil Storage Facility just south of the Mobil site starting in the early 1960's. There were 15 aboveground tanks and two underground storage tanks on the Ashland facility used for storage of a variety of petroleum products. The tanks were removed in 1986 and 1987. This case was under regulatory oversight by the Alameda County Department of Environmental Health up until 1994 when the County requested soil and groundwater investigations. No additional site investigation/cleanup has occurred since that time.

9. **Basin Plan:** The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on June 21, 1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board and the Office of Administrative Law on July 20, 1995, and November 13, 1995, respectively. A summary of regulatory provisions is contained in 23 CCR 3912. The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface waters and groundwaters.

   The potential beneficial uses of groundwater underlying and adjacent to the site include:

   a. Industrial process water supply
   b. Industrial service water supply
   c. Agricultural water supply

   At present, there is no known use of groundwater underlying the site for the above purposes. The water is unsuitable for municipal/domestic uses because of brackish conditions.

   The existing and potential beneficial uses of the Oakland Outer Harbor (Basin Plan) include:

   a. Industrial process supply or service supply
   b. Water contact and non-contact recreation
   c. Wildlife habitat
   d. Fish migration and spawning
   e. Navigation
   f. Estuarine habitat
   g. Shellfish harvesting
   h. Preservation of rare and endangered species

10. **Other Board Policies:** Board Resolution No. 88-160 allows discharges of extracted, treated groundwater from site cleanups to surface waters only if it has

been demonstrated that neither reclamation nor discharge to the sanitary sewer is technically and economically feasible.

Board Resolution No. 89-39, "Sources of Drinking Water," defines potential sources of drinking water to include all groundwater in the region, with limited exceptions for areas of high TDS, low yield, or naturally high contaminant levels. However, as stated above, the groundwater beneath the subject site is unsuitable for municipal/domestic uses because of brackish conditions.

11. **State Water Board Policies:** State Water Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharge and requires attainment of background levels of water quality, or the highest level of water quality which is reasonable if background levels of water quality cannot be restored. Cleanup levels other than background must be consistent with the maximum benefit to the people of the State, not unreasonably affect present and anticipated beneficial uses of such water, and not result in exceedance of applicable water quality objectives. Given the Board's past experience with groundwater pollution cases of this type, it is unlikely that background levels of water quality can be restored. This initial conclusion will be verified when a cleanup plan is prepared. This order and its requirements are consistent with Resolution No. 68-16.

    State Water Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304," applies to this discharge. This order and its requirements are consistent with the provisions of Resolution No. 92-49, as amended.

12. **Preliminary Cleanup Goals:** The dischargers will need to make assumptions about future cleanup standards for groundwater, in order to determine the necessary extent of remedial investigation, interim remedial actions, and the draft cleanup plan. Pending the establishment of site-specific cleanup standards, the following preliminary cleanup goals should be used for these purposes:

    a. **Groundwater**: USEPA National Ambient Water Quality Criteria (Saltwater Aquatic Life Protection) or applicable risk-based levels for ecological receptors in the Oakland Outer Harbor.

    b. **Soil**: 100 mg/kg for total petroleum hydrocarbons as gasoline (TPH-g) and 1,000 mg/kg for total petroleum hydrocarbons as diesel (TPH-d) and heavier ends.

13. **Basis for 13304 Order:** The dischargers have caused or permitted waste to be discharged or deposited where it is or probably will be discharged into waters of the State and creates or threatens to create a condition of pollution or nuisance.

14. **Cost Recovery:** Pursuant to California Water Code Section 13304, the dischargers are hereby notified that the Board is entitled to, and may seek reimbursement for, all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this order.

15. **CEQA:** This action is an order to enforce the laws and regulations administered by the Board. As such, this action is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15321 of the Resources Agency Guidelines.

16. **Notification:** The Board has notified the dischargers and all interested agencies and persons of its intent under California Water Code Section 13304 to prescribe site cleanup requirements for the discharge, and has provided them with an opportunity to submit their written comments.

17. **Public Hearing:** The Board, at a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the dischargers (or their agents, successors, or assigns) shall cleanup and abate the effects described in the above findings as follows:

A. **PROHIBITIONS**

1. The discharge of wastes or hazardous substances in a manner which will degrade water quality or adversely affect beneficial uses of waters of the State is prohibited.

2. Further significant migration of wastes or hazardous substances through subsurface transport to waters of the State is prohibited.

3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of wastes or hazardous substances are prohibited.

B. **TASKS**

The Board strongly encourages joint efforts from the dischargers in completing the following tasks:

1. **ACCESS AGREEMENT**

COMPLIANCE DATE: August 31, 1999

Submit an access agreement acceptable to the Executive Officer signed by both parties to allow timely completion of all work required in this order. Past failures in reaching access agreements have resulted in work delays.

2. **WORKPLAN FOR REMEDIAL INVESTIGATION OF THE FREE PRODUCT, CONTAMINATED GROUNDWATER PLUME, AND METHANE**

COMPLIANCE DATE: September 30, 1999

Submit a workplan, acceptable to the Executive Officer, combining the *Final Cleanup Objective and Action Plan* (Final Cleanup Plan) and its addendum, already approved by Board staff on April 1, 1998, and May 11, 1998, respectively, with additional methane gas investigation.

In addition to the work already proposed, a workplan to delineate the horizontal extent of the methane plume should be proposed. The investigation should include areas where significant amounts of free product were formerly located. Abiotic indicators of anaerobic biodegradation of petroleum hydrocarbons should be collected and analyzed as well. The workplan should describe sampling and analysis procedures to be used. The additional work could be proposed in the form of a second addendum to the Final Cleanup Plan.

3. **COMPLETION OF REMEDIAL INVESTIGATION AND RISK ASSESSMENT**

COMPLIANCE DATE: May 15, 2000

Submit a technical report acceptable to the Executive Officer documenting the completion of Task 2. Because the section, "Evaluation of Site's Final Cleanup Objectives", contained in the original *Final Cleanup Objective and Action Plan*, is largely duplicative of Task B.4 of this Order, it needs not be completed at this time. This technical report should also include a methane risk assessment based on results of the remedial investigation and considering current and future site use and construction scenarios. In particular, it should address the potential explosive dangers due to migration of methane gas into trenches during future construction activities and removal of the surficial cap.

4. **REMEDIATION / RISK MANAGEMENT PLAN**

COMPLIANCE DATE: August 15, 2000

Submit a technical report acceptable to the Executive Officer containing:

a. A summary of remedial investigation results and risk assessment findings
b. Feasibility study evaluating alternative remedial and risk management actions
c. Recommended remedial and risk management actions and cleanup standards
d. Implementation tasks and time schedule

Item b should include projections of cost, effectiveness, benefits, and impact on public health, welfare, and the environment of each alternative action.

Items a through c should consider the guidance provided by Subpart F of the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300), CERCLA guidance documents with respect to remedial investigations and feasibility studies, and State Board Resolution No. 92-49 as amended ("Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304").

Item c should consider the preliminary cleanup goals for soil and groundwater identified in finding 12 and should address the attainability of background levels of water quality (see finding 11).

5. **Delayed Compliance:** If the dischargers are delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the above tasks, the dischargers shall promptly notify the Executive Officer and the Board may consider revision to this Order.

C. PROVISIONS

1. **No Nuisance**: The storage, handling, treatment, or disposal of polluted soil or groundwater shall not create a nuisance as defined in California Water Code Section 13050(m).

2. **Good O&M**: The dischargers shall maintain in good working order and operate as efficiently as possible any facility or control system installed to achieve compliance with the requirements of this Order.

3. **Cost Recovery**: The dischargers shall be liable, pursuant to California Water Code Section 13304, to the Board for all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Order. If the site addressed by this Order is enrolled in a State Board-managed reimbursement program,

reimbursement shall be made pursuant to this Order and according to the procedures established in that program. Any disputes raised by the dischargers over reimbursement amounts or methods used in that program shall be consistent with the dispute resolution procedures for that program.

4. **Access to Site and Records**: In accordance with California Water Code Section 13267(c), the dischargers shall permit the Board or its authorized representative:

   a. Entry upon premises in which any pollution source exists, or may potentially exist, or in which any required records are kept, which are relevant to this Order.

   b. Access to copy any records required to be kept under the requirements of this Order.

   c. Inspection of any monitoring or remediation facilities installed in response to this Order.

   d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the dischargers.

5. **Contractor / Consultant Qualifications**: All technical documents shall be signed by and stamped with the seal of a California registered geologist, a California certified engineering geologist, or a California registered civil engineer.

6. **Lab Qualifications**: All samples shall be analyzed by State-certified laboratories or laboratories accepted by the Board using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control (QA/QC) records for Board review. This provision does not apply to analyses that can only reasonably be performed on-site (e.g. temperature).

7. **Reporting of Changed Owner or Operator**: The Port shall file a technical report on any changes in site occupancy or ownership associated with the property described in this Order.

8. **Reporting of Hazardous Substance Release**: If any hazardous substance is discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, the dischargers shall report such discharge to the Regional Board by calling (510) 622-2300 during regular office hours (Monday through Friday, 8:00 to 5:00).

A written report shall be filed with the Board within five working days. The report shall describe: the nature of the hazardous substance, estimated quantity involved, duration of incident, cause of release, estimated size of affected area, nature of effect, corrective actions taken or planned, schedule of corrective actions planned, and persons/agencies notified.

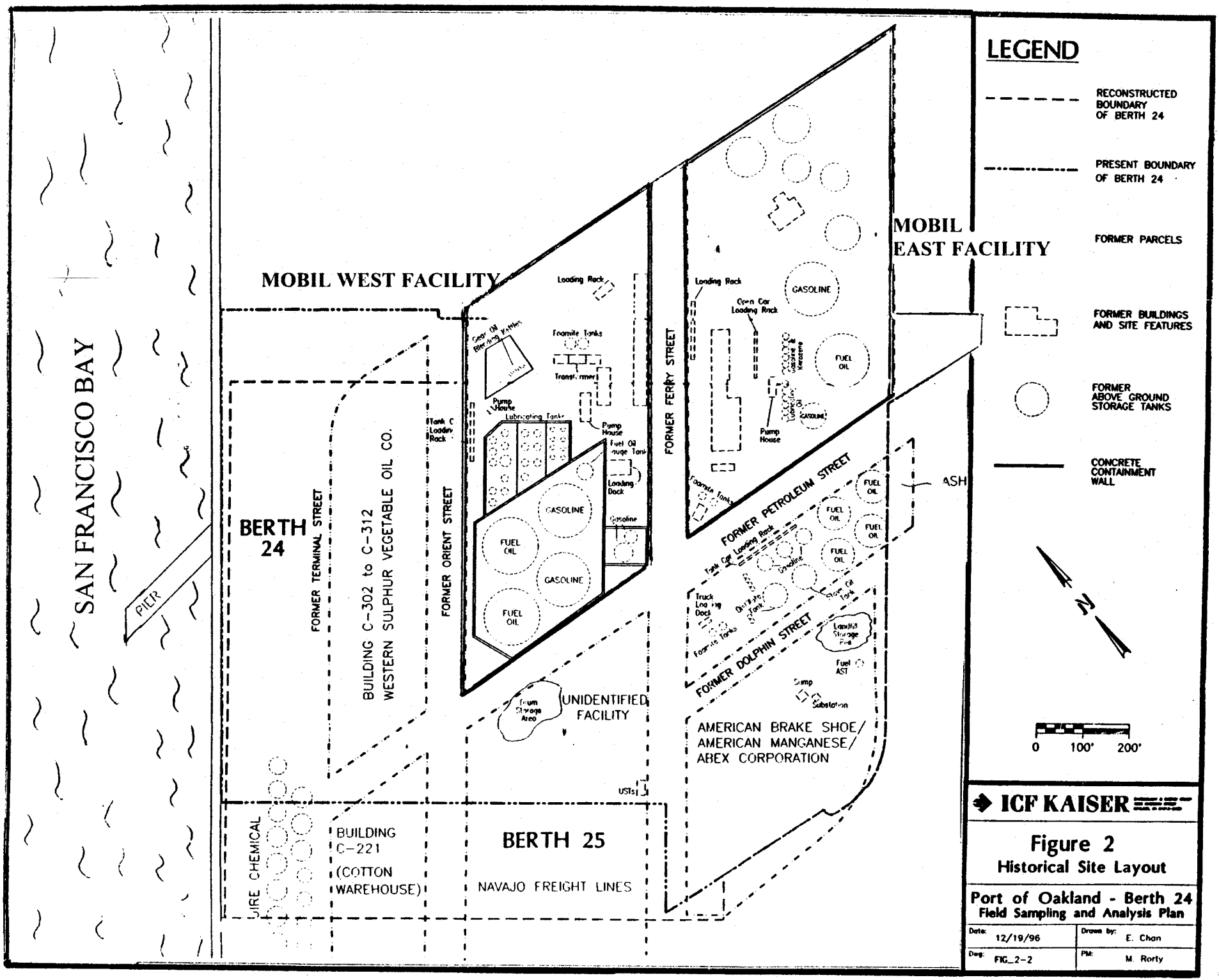
This reporting is in addition to reporting to the Office of Emergency Services required pursuant to the Health and Safety Code.

9. **Periodic SCR Review**: The Board will review this Order periodically and may revise it when necessary. The dischargers may request revisions and upon review the Executive Officer may recommend that the Board revise these requirements.

I, Loretta K. Barsamian, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on July 21, 1999.

Loretta K. Barsamian
Executive Officer

FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ORDER MAY SUBJECT YOU TO ENFORCEMENT ACTION, INCLUDING BUT NOT LIMITED TO: IMPOSITION OF ADMINISTRATIVE CIVIL LIABILITY UNDER WATER CODE SECTIONS 13268 OR 13350, OR REFERRAL TO THE ATTORNEY GENERAL FOR INJUNCTIVE RELIEF OR CIVIL OR CRIMINAL LIABILITY

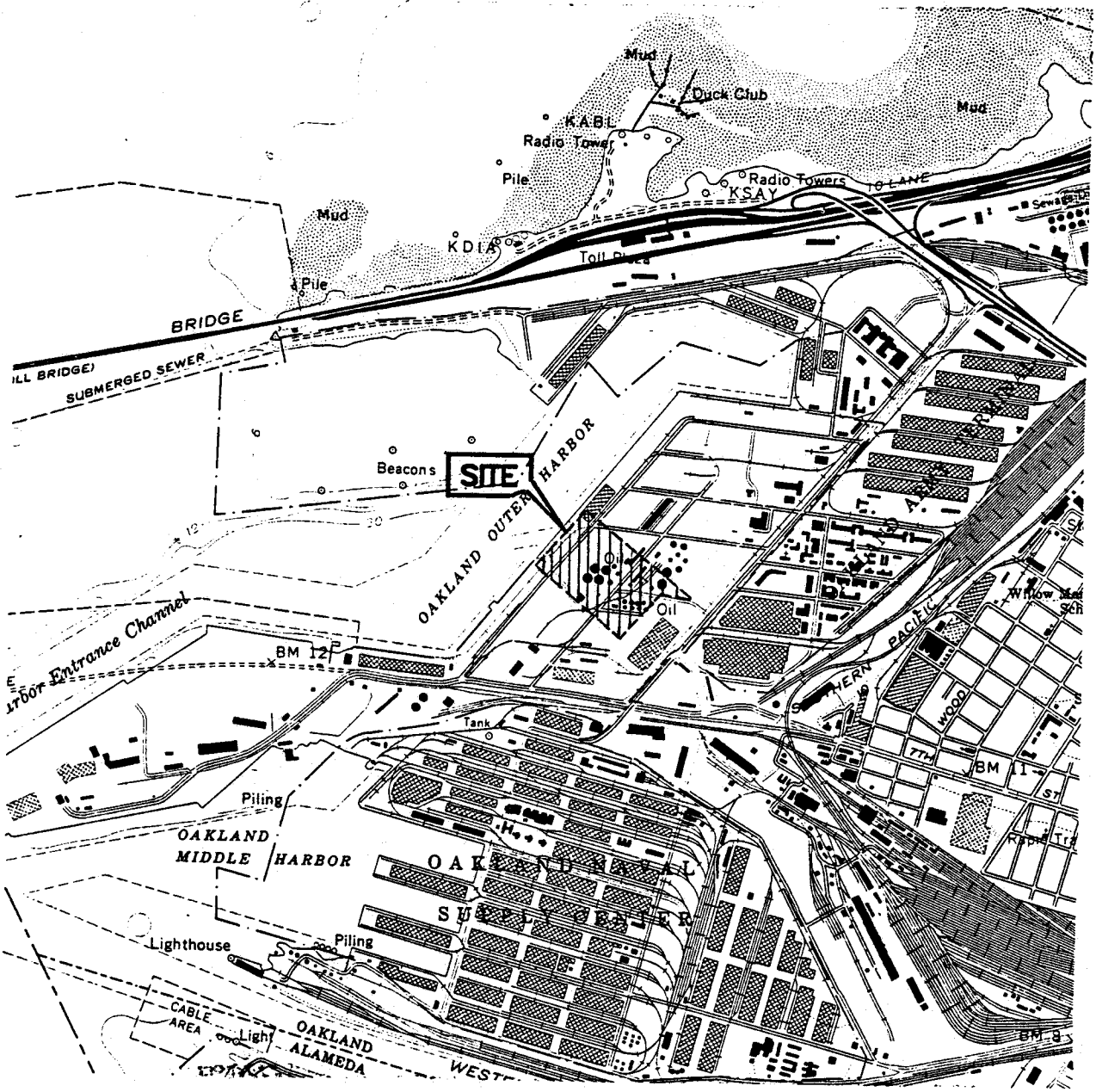


ICF KAISER

Figure 2
Historical Site Layout

Port of Oakland - Berth 24
Field Sampling and Analysis Plan

Date: 12/19/96	Drawn by: E. Chan
Dwg: FIG_2-2	PM: M. Rorty



SOURCE:
USGS MAP, OAKLAND WEST QUADRANGLE, CALIFORNIA. 7.5 MINUTE SERIES. 1959. PHOTOREVISED 1980.

N

0 1000' 2000'

FIGURE 1

SITE VICINITY MAP

FORMER MOBIL OIL BULK TERMINAL
909 FERRY STREET
OAKLAND, CALIFORNIA

PROJECT NO. 10-098

ALISTO ENGINEERING GROUP
WALNUT CREEK, CALIFORNIA

100989---DWG 2-1-94 RNW 1=1